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| **Set 0. Visualizing Data** |

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| **Skill 0.1: Investigate the ways we can visualize data**  **Skill 0.2: Differentiate between correlation and causation**  **Skill 0.3: Identify metadata** |

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| **Skill 0.1: Investigate the ways we can visualize data** |

**Skill 0.1 Concepts**

[**Skill 0.1 Exercise**](https://hpluska.github.io/APCompSciPrinciples/ticketOutTheDoor/set0/Set0TicketOutTheDoorAPCompSciPrinciples.pdf) [**1**](https://hpluska.github.io/Chemistry/ticketOutTheDoor/Set0TicketOutTheDoorChemistry.pdf)

Today we are going to get practice in telling a data story based on a data visualization. Let's start by looking at a few examples of a data visualization.

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| **Where have all the teenagers gone?** |
| A graph of a number of people with red lines  Description automatically generated |

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| [A Fast-Food Problem: Where Have All the Teenagers Gone?](https://www.nytimes.com/2018/10/09/learning/whats-going-on-in-this-graph-oct-10-2018.html) |
| A graph of a number of people with red lines  Description automatically generated |

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| [Houston May Get 50 Inches of Rain. How Long Does it Take Your City to Get That Much?](https://www.nytimes.com/2017/09/19/learning/whats-going-on-in-this-graph-sept-19-2017.html) |
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[**Skill 0.1 Exercise**](https://hpluska.github.io/APCompSciPrinciples/ticketOutTheDoor/set0/Set0TicketOutTheDoorAPCompSciPrinciples.pdf)[**2**](https://hpluska.github.io/Chemistry/ticketOutTheDoor/Set0TicketOutTheDoorChemistry.pdf)

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| **Skill 0.2: Differentiate between correlation and causation** |

**Skill 0.2 Concepts**

The charts above give us information: a collection of facts and patterns extracted from data. We can use this information to identify trends, make connections and address problems.

There are two distinctions we need to make when looking at a chart or visualization,

* What does the data show?
* Why might that be the case?

The *"what"* is the facts of the matter. For example, the percentage of teenagers in the workforce has decreased since 2000. The *"why"* is an informed opinion. Fewer teenagers are working because more are focused on their education and earning scholarships.

As you were determining the *“why”*, you may have been tempted to draw concrete connections. However, it's important to remember that correlation (similarities, patterns) does not equal causation (this thing caused that thing). There can be any number of reasons why a pattern or interesting data point may appear in a chart - and our job is to make an informed decision while recognizing that there may be multiple factors at play. Usually, additional research with several data sets is necessary to understand the exact nature of the relationship between data. Did this one thing cause another thing to happen? Do more people search for chocolate because they want to give it as a gift, or could there perhaps be another reason?

**Correlation** does not equal **Causation**

Check out the following examples,

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[**Skill 0.2 Exercise**](https://hpluska.github.io/APCompSciPrinciples/ticketOutTheDoor/set0/Set0TicketOutTheDoorAPCompSciPrinciples.pdf)**s 1 thru 4**

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| **Skill 0.3: Identify metadata** |

**Skill 0.3 Concepts**

When we consider datasets, it's helpful to know as much about those datasets as possible. Where did the data come from? How much data is included? When was it collected?

All of this information is considered **metadata** which is defined as "data about data".

Meta data differs from the primary data in several ways,

* It can be changed without impacting the primary data
* Used for finding, organizing, and managing information
* Increases effective use of data by providing extra information

Consider the metadata for the image shown below,

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| A close up of a cat  Description automatically generated |
| A screenshot of a computer  Description automatically generated |

Or, the metadata for a simple email,

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| Delivered-To: heidi.pluska@boiseschools.org  Received: by 2002:a05:6a10:c849:b0:4e4:a636:7fe3 with SMTP id v9csp91318pxy;  Wed, 9 Aug 2023 17:18:09 -0700 (PDT)  X-Received: by 2002:a05:6a21:9994:b0:12e:7ff9:b612 with SMTP id ve20-20020a056a21999400b0012e7ff9b612mr1074235pzb.45.1691626689157;  Wed, 09 Aug 2023 17:18:09 -0700 (PDT)  ARC-Seal: i=3; a=rsa-sha256; t=1691626689; cv=pass;  d=google.com; s=arc-20160816;  b=djhjJ1F1iwwOKpRDRBjXodrewTO9u+Eef1lztwWbjakUGcDxF6Tv87FomgCUAeCmiU  npXUPMiwLY0JDnmWHSCyU6vO+1+z4cNVtAHlRsS8DYE3WFe5A7Rhatr6QVQJ3BFdf/Za  vezdBG3Yoj2MrGgo+Y2jGMA1NcfNomo7DeklxUYW0lxhKDlOmfbmzGQPJAviVEbIbSvA  bVNQk1MuOjuS9v0eIJhesHFCJVK7mJsdkBDMgRadp/cbj36oyRIzeRqsc2/PtwhJgxY+  rjSLwawzHpGInP2rmcFMzB2Yr1KMygfhKAjCAHJCOgt0b4d4vqpf9xDZHz8CzBzLTW31  qD/Q==  ARC-Message-Signature: i=3; a=rsa-sha256; c=relaxed/relaxed; d=google.com; s=arc-20160816;  h=list-unsubscribe:list-archive:list-help:list-post:list-id  :mailing-list:precedence:reply-to:to:subject:message-id:date:from  :mime-version:dkim-signature;  bh=BTW9gcu4Q0IEMkwJ2g4l4725cX+f4xU3qfF+gpNKA+A=;  fh=c06MAeFQ150f7/62zwUC/qQ7khF5udKKgZaxHfAPtuQ=;  b=HrcLzo0LCdCOpwpGL5a0HFH1+yLlIZPiImENwIyI+df7wNEzvLSAIP1dJB8OGWfqWh  P15D/NQFmnaATZBH9hk0ywnxHjK7wMb5zosTPqrOTw7v44nNq8PHu16ejMrmCt0NNtrO  CfniwSPZP9qw9hzkUIkMAoL4q43yvAz0G1YDHppZDyWbq3z8bd8PRQ6SOVEsPrdLlF0Y  75MRqOqFicPZsDwUlUsaNW63HcTqPlnULhVzGUDDX5TFVDnH5P7H0dXq2VkfNyT/1+mH  GTZk34fVHTBFP5FMRghnW7WuirJzL4cBjdQzMbbos+yH+J1vkBQGQRo9ZX7A6zb3fygL  aIwQ==  ARC-Authentication-Results: i=3; mx.google.com;  dkim=pass header.i=@boiseschools.org header.s=google header.b=e2YS5TAj;  arc=pass (i=2 spf=pass spfdomain=boiseschools.org dkim=pass dkdomain=boiseschools.org dmarc=pass fromdomain=boiseschools.org);  spf=pass (google.com: domain of timberline+bncbcq5rigc6yjrbk6z2ctamgqenxpvlvy@boiseschools.org designates 209.85.220.69 as permitted sender) smtp.mailfrom=timberline+bncBCQ5RIGC6YJRBK6Z2CTAMGQENXPVLVY@boiseschools.org;  dmarc=pass (p=NONE sp=NONE dis=NONE) header.from=boiseschools.org  Return-Path: <timberline+bncBCQ5RIGC6YJRBK6Z2CTAMGQENXPVLVY@boiseschools.org>  Received: from mail-sor-f69.google.com (mail-sor-f69.google.com. 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(tech leads can help with this!)  2. contact the Help Desk <https://support.boiseschools.org/> so that they  can follow up and get the device properly managed. Without IT servicing,  the device will continue to have issues.  --  Michaela Aird  Spanish 3 & 4  AP Capstone Research  Timberline High School  World Languages Department Head  Building Tech Lead  --000000000000864b420602868612  Content-Type: text/html; charset="UTF-8"  Content-Transfer-Encoding: quoted-printable  <div dir=3D"ltr"><div class=3D"gmail\_default" style=3D""><font face=3D"aria=  l, sans-serif">If you are experiencing issues with your Windows laptop conn=  ecting to wireless please follow these steps:</font></div><div class=3D"gma=  il\_default" style=3D""><font face=3D"arial, sans-serif"><br></font></div><d=  iv class=3D"gmail\_default" style=3D""><font face=3D"arial, sans-serif">1. c=  onnect=C2=A0to wi-fi network=C2=A0<b>BSD-Devices</b>=C2=A0with password=C2=  =A0<b>Boise2023=C2=A0</b></font></div><div class=3D"gmail\_default" style=3D=  ""><font face=3D"arial, sans-serif">OR<b>=C2=A0</b>plug in to the wall with=  an ethernet cable, restart, and=C2=A0log in.</font></div><div class=3D"gma=  il\_default" style=3D""><font face=3D"arial, sans-serif">(tech leads can hel=  p with this!)</font></div><div class=3D"gmail\_default" style=3D""><font fac=  e=3D"arial, sans-serif"><br></font></div><div class=3D"gmail\_default" style=  =3D""><font face=3D"arial, sans-serif"><font color=3D"#000000">2.=C2=A0cont=  act the=C2=A0<a href=3D"https://support.boiseschools.org/" target=3D"\_blank=  " style=3D"">Help Desk</a>=C2=A0so that they can follow up and get the devi=  ce properly managed. Without IT servicing, the device will continue to have=  issues.=C2=A0</font><b style=3D"color:rgb(230,145,56)">=C2=A0</b></font></=  div><font face=3D"arial, sans-serif"><span class=3D"gmail\_signature\_prefix"=  >--</span></font><div><font face=3D"arial, sans-serif"><span class=3D"gmail=  \_signature\_prefix"></span><br></font><div dir=3D"ltr" class=3D"gmail\_signat=  ure" data-smartmail=3D"gmail\_signature"><div dir=3D"ltr"><div><div dir=3D"l=  tr"><font face=3D"arial, sans-serif">Michaela Aird</font><div><font face=3D=  "arial, sans-serif"><br></font></div><div><font face=3D"arial, sans-serif">=  Spanish 3 &amp; 4=C2=A0</font></div><div><font face=3D"arial, sans-serif">A=  P Capstone Research=C2=A0</font></div><div><font face=3D"arial, sans-serif"=  >Timberline High School=C2=A0</font></div><div><font face=3D"arial, sans-se=  rif">World Languages Department Head</font></div><div><font face=3D"arial, =  sans-serif">Building Tech Lead</font></div></div></div></div></div></div></=  div>  --000000000000864b420602868612-- |

[**Skill 0.3 Exercises 1 thru 4**](https://hpluska.github.io/APCompSciPrinciples/ticketOutTheDoor/set0/Set0TicketOutTheDoorAPCompSciPrinciples.pdf)